Matthew Cooper, D.Sc.

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SUMMARY

Expertise
○ Extensive research experience in automatic analysis, mining, and retrieval of audio, text, music, image, video and multi-modal data resulting in over 70 professional publications, thirty U.S. patents, and more than 15 pending patent applications
○ Engineering experience developing and maintaining recommendation systems for application with 30M registered users
○ Broad interests and background including machine learning, probabilistic modeling and inference, recommendation systems, information retrieval, and information theory
○ Distinguished Member of the ACM (2017), Senior Member of the IEEE, ACM (2010)

Skills
○ *committed to continuously learning new tools, languages, environments*
○ Experience with MySql, Mode analytics, Astronomer, airflow, snowflake
○ Experience with AWS: S3, Lambda, ECR, DynamoDB, ElasticSearch, Sagemaker, Redshift, Metaflow
○ Extensive rapid research prototyping experience using Python, scikit-learn, pandas, numpy, C/C++, Octave/MATLAB
○ Experience developing systems for generic and scalable analysis and processing of multimedia and sensor data using Python, C/C++, and Java
○ Experience building and deploying analysis components within interactive systems for multimedia management and information retrieval
○ Experience with pytorch, keras, hadoop, NLTK, Spark, R, node.js, mongoDB, MySQL, cython
○ Experience leading research projects, collaborating within teams, and mentoring researchers, engineers, and interns

EDUCATION

Washington University in St. Louis, St. Louis, MO
D.Sc. Dept. of Electrical Engineering, 1999
M.S. Dept. of Electrical Engineering, 1994
Research Advisor: Prof. Michael I. Miller
Boeing-McDonnell Foundation Fellowship, 1998 - 1999
Office of Naval Research AASERT Fellowship, 1996 - 1997

Washington University in St. Louis, St. Louis, MO
B.S. Major: Electrical Engineering, Minor: Computer Science, 1993
State of Missouri Bright Flight Scholarship, 1989 - 1993
Washington University School of Engineering and Applied Science Dean's Honorary Scholarship, 1989 - 1993

coursera.org
Deep Learning Specialization by DeepLearning.AI on Coursera. Certificate earned February, 2018
Natural Language Processing Specialization by DeepLearning.AI on Coursera. Certificate earned December, 2020

EXPERIENCE additional details available.

Mozilla, San Francisco, CA
Staff Software Engineer, Machine Learning & Recommendations 2018 - Present
○ Member of the data and learning team at pocket. We work with the editorial and engineering teams to power all content recommendation services.
○ Developed data mining tools to identify prospective content for the firefox new tab and for our syndication efforts.
○ Developed recommendation pipeline for explore pages with 28% CTR and 20M monthly pageviews

FX Palo Alto Laboratory (FXPAL), Palo Alto, CA
FXPAL performed information technology research for Fuji-Xerox, Co., Ltd.
Principal Research Scientist 2016 - 2018
Senior Research Scientist & Group Lead, Integrative Analytics 2012 - 2016
Senior Research Scientist 2004 - 2012
Research Scientist, 2000 - 2004

○ Research on content-based multimedia analysis to facilitate media management and information retrieval. Designed systems to process multimedia and multi-modal data. Provided applied machine learning design and development support lab-wide.
○ Core member of development team for Talkminer lecture video search system with over 60,000 web-distributed lecture videos (C/C++, Python)
○ Developed and validated systems for large-scale video analysis and interactive video search in conjunction with the TRECVID evaluation (C/C++, Python)
○ Member of Technical Assessment Panel for reviewing proposed inventions and helping determine patenting strategy
○ Supervised and co-supervised graduate student interns

NetCapita, Inc., Baltimore, MD
Software Engineer 1999 - 2000
○ Research and development of low bandwidth internet videoconferencing software.
○ Technology is now under development at Animetrics, Inc., Jackson, NH. (C/C++, OpenGL)

Center for Imaging Science, Johns Hopkins University, Baltimore, MD
Research Assistant 1998 - 1999
Completed thesis research on information-theoretic analysis of generic object recognition. The research enables a quantitative characterization of the information content of a sensor observation (sensors included video cameras, infrared cameras, and radar systems) in terms of the pose parameters of observed objects. (MATLAB, C/C++, OpenGL)

Dept. of Electrical Engineering, Washington University, St. Louis, MO
Research Assistant 1996 - 1998, 1993-1994
Developed automated object recognition algorithms using infrared radar systems and an efficient representation of the radiant appearance of observed objects to achieve robustness to thermodynamic variability. (MATLAB, C/C++, OpenGL)

Programmer and Analyst 1994 - 1995
Washington University School of Medicine, Genome Sequencing Center
Developed and implemented image processing algorithms and software for four color electrophoretic DNA sequencing. Subsequent versions of the algorithms and software were used to sequence *C. elegans* and the human genome. (C programming)

PUBLICATIONS **Selected articles**

D. Avrahami, M. Patel, Y. Yamaura, S. Kratz, and **M. Cooper**. Unobtrusive Activity Recognition and Position Estimation for Work Surfaces using RF-radar Sensing. *ACM Transactions on Interactive Intelligent Systems* **10**(1), 2019.

J. Zhao, C. Bhatt, **M. Cooper**, and D. Shamma. Flexible Learning with Semantic Visual Exploration and Sequence-Based Recommendation of MOOC Videos. *Proc. of the 2018 CHI Conference on Human Factors in Computing Systems*. Paper No.: 329 Pages 1-13, 2018.

M. Cooper, J. Biehl, G. Filby, S. Kratz. LoCo: Boosting for indoor location classification combining Wi-Fi and BLE. *Personal and Ubiquitious Computing*, 2016.

S. Carter, **M. Cooper**, L. Denoue, J. Doherty, V. Rugoobur. Supporting media bricoleurs. *ACM interactions*, 2014.

L. Denoue, **M. Cooper**, and S. Carter. Searching Live Meetings: "Show me the Action". *Proc. of ACM Document Engineering* (DocEng) 2015.

M. Cooper. Clustering Geo-tagged Photographs using Dynamic Programming *Proc. ACM Multimedia*, p. 1025-1028, 2011.

J. Pickens, **M. Cooper**, and G. Golovchinsky. Reverted Indexing for Feedback and Expansion. *Proc. ACM Conf. on Information and Knowledge Management (CIKM)*, p. 1049-1058, 2010.

J. Adcock, **M. Cooper**, L. Denoue, H. Pirsiavash, and L. A. Rowe. TalkMiner: A Lecture Webcast Search Engine. *Proc. ACM Multimedia 2010*, p. 241-250, 2010.

M. Cooper, Image Categorization Combining Neighborhood Methods and Boosting,*Proc. ACM Multimedia 2009*. Workshop on Large-Scale Multimedia Retrieval and Mining.

M. Cooper, T. Liu, and E. Rieffel. Video Segmentation via Temporal Pattern Classification. *IEEE Transactions on Multimedia*, **9**(3):610-618, 2007.

M. Cooper, J. Foote, E. Pampalk, and G. Tzanetakis. Audio Visualization for Music Information Retrieval. *Computer Music Journal*, **30**(2):42–62, 2006.

M. Cooper, J. Foote, A. Girgensohn, and L. Wilcox. Temporal Event Clustering for Digital Photograph Collections. *ACM Trans. on Multimedia Computing, Communications, and Applications*, **1** (3):269–288, 2005.

M. Cooper and M. Miller. Information Measures for Object Recognition Accommodating Signature Variability. *IEEE Trans. on Information Theory*, **46**(5):1896–1907, 2000.

M. Cooper, D. Maffitt, J. Parsons, L. Hillier, and D. States. Lane Tracking Software for Four-color Fluorescence-based Electrophoretic Gel Images. *Genome Research*, **6**(11):1110-1117, 1996.

REFERENCES Available upon request.